

P E T I T I O N

1 Commissioner for Patents
Alexandria, VA 22313

5 Your Petitioners, JOSEPH S. WEWEL, DANA G. ROSENBERG, and BEAU D. KUIPERS, citizens of the United States and residents of the State of Nebraska, whose post office addresses are 605 Thornbird Drive, Fremont, Nebraska 68025-6446; 3106 Memphis Place, Grand Island, Nebraska 68803-4156; and 527 Nebraska Hall, Lincoln, Nebraska 68588-0601, respectively, pray that Letters Patent may be granted to them for a

10 SELF-STORING STANDARD FOR A GAME NET

as set forth in the following specification.

BACKGROUND OF THE INVENTION

15 The present invention relates to standards for game nets, and more particularly to an a self-storing standard that is height adjustable for different games and abilities of players.

DESCRIPTION OF THE PRIOR ART

20 Game nets are crucial pieces of equipment for playing various sports, such as volleyball, badminton and tennis. The net is typically supported by a pair of vertically disposed standards that are spaced horizontally from one another. Tension is applied to the net in order to ensure that it is tautly supported for proper playing conditions. Oftentimes, the playing surface where these nets are used may have to be used for several different sports and activities. One typical example of such a playing surface may be the floor of a gymnasium. Due to the fact that gymnasiums are used for so

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1 many different activities, the net standards are rarely permanently disposed on the
gymnasium floor. A typical prior art method of supporting the standards uses a
weighted stand that receives the lower end of a standard and holds the same in
position. The stand is releasably placed on top of the playing surface. The stands are
5 often rolled into and out of position using a pair of wheels affixed to one end of the
stand. Another prior art method of engaging standards with the playing surface
involves a locking ring or collar permanently disposed in the gymnasium floor that
releasably receives the lower end portion of each standard. With each of these prior art
methods, however, the net and standards must be removed and stored in an equipment
10 room when they are not in use.

One prior art method for dealing with the issue of storing net standards is
disclosed within U.S. Patent No. 5,242,174. That patent discloses a net standard that
is telescopically received beneath the playing surface. However, that system suffers
15 from a number of deficiencies. First, the system lacks a good method for tensioning the
net. To be sure, prior art methods of tensioning the net incorporate bulky wheels and
gear systems that are disposed on the outer surface of the standard, rendering the
same too large to be telescopically stored beneath the playing surface. The system
disclosed by the '174 patent is also inflexible in that it is built to provide a single
20 "volleyball" height for supporting the net. There is no easy means for altering the height
for youth league or lowering the height of the net to be adjacent the playing surface for
playing tennis. Finally, the disclosed system must be raised and lowered manually,

1 which can be tedious, if not impossible, for some individuals. Moreover, the manual
raising and lowering of the net system increases the risk of personal injury.

5 Other prior art systems have been provided for raising and lowering the height of
the net. However, these systems have not been incorporated within a net standard that
is fully retractable beneath the playing surface. Moreover, these systems typically raise
and lower the net along the length of the net standard, leaving a substantial portion of
the standard disposed above the top of the net in many of the lower height settings.
10 These types of systems are also undesirable for the reason that the mechanisms used
for raising and lowering the net are bulky and oftentimes increase the risk of personal
injury.

Accordingly, what is needed is a standard for supporting a game net that is self-
storing beneath the playing surface but is also provided with an adequate net tensioning
system and the ability to adjust between several pre-set net heights.

15 SUMMARY OF THE INVENTION

The standard for supporting a game net of the present invention is generally
provided with an elongated net support having a net tensioning system disposed
therein. The net support is telescopically received within, and is extendable from, an
elongated lower support. Both the net support and lower support are telescopically
20 received within, and extendable from, a housing that is disposed beneath the playing
surface. Power cylinder mechanics is preferably used for the automatic raising and
lowering of the standard.

1 The tensioning system is operated using a removable handle, allowing the user
to properly tension the net prior to play and telescopically store the standard beneath
the playing surface once play has been completed. Supplementary net tensioning is
provided to the lower end portion of the net using a simple ratchet pulley that is coupled
5 to the lower support line of the net. The lower support line quickly and easily engages
the standard via a keyhole coupling system. The standard is preferably disposed so
that it is positioned at an angle with respect to the perpendicular when it is disposed
above the ground. Accordingly, when the proper tension is applied to the net, the
standard is "pulled" into proper perpendicular alignment with the playing surface.

10 The standard is provided with a plurality of pre-set stops for setting the net at a
number of different heights for different abilities and games to be played. Regardless
of the height at which the net is positioned, the standard is positioned to generally
extend no higher than the top of the net.

15 It is therefore one of the principal objects of the present invention to provide a
standard for game nets that is self-storing beneath a playing surface.

It is another object of the present invention to provide a standard for a game net
with a net tensioning system that is disposed within the standard to allow for easy
storage of the standard beneath a playing surface.

20 Yet another object of the present invention is to provide a standard for a game
net that is easily raised above and stored beneath a playing surface using power
cylinder mechanics.

1 Still another object of the present invention is to provide a standard for game
nets having a plurality of pre-set net heights for various games and playing abilities.

5 Yet another object of the present invention is to provide a standard for game
nets with a system for adjusting the height of the net with respect to the playing surface
that prevents the standard from projecting above the height of the net at any net height
setting.

10 A further object of the present invention is to provide a standard for game nets
that is provided with a supplemental net tensioning system that quickly and easily
couples the lower end portion of the net to the standard.

15 Still another object of the present invention is to provide a standard for game
nets that is simple in construction and use.

These and other objects of the present invention will be clear to those of skill in
the art.

20 BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a partial exploded view of one embodiment of the standard of the
present invention;

25 Figure 2 is a partial cut-away view of one embodiment of the net tensioning
system of the present invention;

Figure 3 is a partial exploded view of one embodiment of the base receptacle
assembly of the present invention;

Figure 4 is a top view of the base receptacle assembly of Figure 3;

Figure 5 is a partial isometric view of one embodiment of the bottom rope assembly of the present invention;

Figure 6A is a partial side elevation view of one embodiment of the standard of the present invention, as the same may be set at a regulation volleyball height;

Figure 6B is a partial side elevation view of the standard of Figure 6A, as the same may be set at a regulation tennis height;

Figure 6C is a partial side elevation view of the standard of Figure 6A, as the same may be set at a youth league volleyball height; and

Figure 7 is a partial isometric view of an alternate net tensioning system of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The standard 10 of the present invention is generally depicted in Figure 1 and in Figures 6A-6C as the same might be used to support a game net 12. However, it is contemplated that the standard 10 could be used in several different applications, including, but not limited to, supporting a flag, a banner, or even serving as a simple microphone stand. For ease of description herein, the same will be described simply as it could be used for supporting a game net 12 above a playing surface 14.

The standard 10 is generally comprised of at least an elongated net support 16 having an upper end 18 and a lower end portion 20. A net tensioning system 22, which is depicted in Figures 1 and 2, is preferably secured within the interior portion of the net support 16. The net tensioning system 22 is preferably provided with an elongated tensioning screw 24 having mating threads disposed along its length. The tensioning

1 screw 24 is generally coaxially disposed within the outer tube 26 of the net tensioning
system 22. The tensioning screw 24 is rotatably supported within the tube 26 at its
opposite ends using a first bearing assembly 28 and a second bearing assembly 30. A
gear box 32 is disposed adjacent the second bearing assembly 30. The gear box 32 is
5 preferably comprised of a drive shaft assembly 34 which is received by a first miter gear
36. The first miter gear 36 is meshed with a perpendicularly disposed second miter
gear 38 which is coupled with the tensioning screw 24. Accordingly, as the drive shaft
assembly 34 is rotated, the first and second miter gears cooperate to rotate the
tensioning screw 24. A crank handle 40, or similarly operating manual or automatically
10 powered device, is removably engaged with the drive shaft assembly 34. Accordingly,
as the crank handle 40 is rotated, the gear box assembly 32 operates to rotate the
tensioning screw 24. A tensioning nut 42 is threadably received by the tensioning
screw 24 within the tube 26. Accordingly, as the tensioning screw 24 is rotated, the
15 tensioning nut 42 is moved along the length of the tensioning screw 24.

It is contemplated that the net tensioning system could be comprised of a worm
gear drive assembly in place of the tensioning screw 24, gear box 32 and tensioning nut
42. An example of such a worm gear drive assembly is depicted in Figure 7. The worm
gear drive assembly is preferably provided with a drive shaft 112 having a drive gear
20 114 which cooperates with a worm gear 116 to rotate a mating gear assembly 118.
The mating gear assembly is preferably provided with a strap shaft 120, on which the
tensioning line 44 could be wound and unwound to apply tension to the net 12.

1 The tensioning nut 42 is preferably coupled to the net 12 via a tensioning line 44.
It is contemplated, however, that the tensioning line 44 could simply be replaced using
an elongated free end of the upper line extending from the net 12. The tensioning line
44 is preferably coupled with the net using a hook 46 or similar structure that provides
5 quick and easy engagement with the upper portion of the net 12. The tensioning line
44 enters the tensioning system 22 and is preferably engaged first by the roller guide 48
and then a plurality of bushings 50, which guide the tensioning strap 44 to the
tensioning nut bushing 52 and up to an anchor 54. Accordingly, it can be seen in
10 Figure 2 that as the tensioning nut 42 is advanced and retracted along the length of the
tensioning screw 24, the tensioning line 44 is withdrawn and extended from the
tensioning system 22 to adjust the tension applied to the net 12 as desired. Although it
is contemplated that a second net tensioning system 22 could be disposed within the
opposing standard supporting the net 12, it is also contemplated that a fixed tensioning
15 strap assembly could also be provided in its place.

 The net support 16 is preferably telescopically received within and extended from
a lower support 56, having an upper end 58 and a lower end portion 60. A stop collar
61 is preferably secured within the upper end 58 of the lower support 56 that is sized to
20 slide along the length of the net support 16 until meeting the enlarged stop 63 at the
lower end portion 20 of the net support 16. In this manner, the net support 16 is
prevented from complete withdrawal from within the lower support 56. The lower
support 56 is telescopically received within and selectively extendable from an
elongated housing 62, having an upper end portion 64 and a lower end portion 66. A
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1 base assembly 68 is preferably positioned adjacent the upper end portion 64 of the
housing 66 and generally flush with the playing surface 14. A cover 70 is provided for
covering the base assembly 68 (as depicted in Figure 4) when the standard 10 is fully
retracted beneath the playing surface 14. In this manner, a generally uniform playing
5 surface 14 is provided that will not interfere with alternate uses of the playing surface
14.

The base assembly 68 is generally provided with a locking lug 72 which is
slidably mounted within the base assembly 68 to move perpendicularly toward and
away from the standard 10. A spring 74 can be provided to bias the locking lug 72
10 toward the standard 10. A locking lever 76 is pivotably coupled with the base assembly
68 to selectively engage an activator plate 78 to which the locking lug 72 is secured.
Accordingly, activation of the locking lever 76 to engage the activator plate 78 will move
the locking lug 72 away from the standard 10, allowing the same to extend from or
15 retract within the housing 62.

A plurality of height adjustment stops 80 are disposed along the length of the
outer surface of the lower support 56. Although the height adjustment stops 80 are
depicted as a collar having an engagement edge 82, it is only necessary to provide
sufficient structure to engage the locking lug 72 so that retraction of the standard 10
20 inot the housing 62 is prevented. In the embodiment depicted in Figure 1, guide collars
84 and 86 are provided to help stabilize the lower support 56 within the housing 62.
Where collars or similar structures are used as the height adjustment stops 80, it is
preferred that the edge portions 83 that do not engage the locking lug 72 be beveled,

1 as indicated in Figure 1, to permit the smooth passage of the locking lug 72. It is
preferred that the positioning of the height adjustment stops 80 along the length of the
lower support 56 coordinate with one or more pre-selected height adjustments for the
standard 10. For example, Figure 6A depicts the standard 10 as it could be used to
5 support the game net 12 at a height suitable for use in an adult volleyball game. This
position is attained by the engagement of the locking lug 72 beneath the engagement
edge 82 of the lowermost height adjustment stop 80 on the lower support 56. Figure
6B depicts the standard 10 as supporting the net 12 at a height suitable for playing
10 tennis. This position is attained by engaging the locking lug 72 with the engagement
edge 82 of the uppermost height adjustment stop 80 on the lower support 56. Likewise,
Figure 6C depicts the standard 10 as the same could be positioned at a height
intermediate the "volleyball" height of Figure 6A and the "tennis" height of Figure 6B, so
that a youth league could play volleyball or some other sport.

15 A plunger assembly 88 is preferably disposed within the net support 16, adjacent
the net tensioning system 22. The plunger assembly 88 is generally provided with a
plunger 90 that is biased outwardly from the plunger assembly 88 using a spring or
other similar structure. The plunger 90 is first positioned to extend outwardly from an
opening 92 in the side of the net support 16. The plunger 90 remains in this retracted
20 state until the net support 16 is extended from within the lower support 56 a sufficient
distance for the plunger 90 to pass the upper end portion 58 of the lower support 56.
As the plunger 90 passes that point, it fully extends to provide a positive stop,
preventing the net support 16 from retracting within the lower support 56 at an

undesirable time. The plunger 90 can be selectively moved to its retracted position by either manually depressing the same or by depressing a pin 94 that is operatively engaged with the plunger 90 using a bell crank or similar device.

Although it is contemplated that the standard 10 could be manually extended from and retracted within the housing 62, it is preferred that power cylinder mechanics such as a pneumatic or hydraulic system be employed to automate the same. Preferably, a pneumatic line 96 would be disposed between a pneumatic coupler 98 at the base assembly 68 and a fitting 100 at the lower end portion 66 of the housing 62. It is contemplated, however, that the pneumatic line 96 could be coupled directly to a remote pneumatic source via lines that run away from the standard 10 beneath the playing surface 14. With the pneumatic source being coupled to the lower end portion 66 of the housing 62, piston seals 102 and 104 are coupled to the lower end portions 60 and 20 of the lower support 56 and the net support 16, respectively. It is preferred that the piston seal 102 be positioned to be in engagement with the inner surface of the housing 62 (and likewise that the piston seal 104 be placed in engagement with the inner surface of the lower support 56) to properly seal the openings of the system. Accordingly, as pneumatic (or hydraulic, when desired) pressure is applied to the system, the net support 16 will extend from the lower support 56, which will extend from the housing 62. Once the standard 10 is at full extension, the addition of pneumatic pressure can be stopped. The user may then slowly release the pneumatic pressure until the lower support 56 is positioned adjacent the locking lug 72 at the desired height, in which the locking lug 72 is allowed to engage the recess 86 or other provided

1 structure to support the standard 10 in position. When it is desired to store the
standard 10, the user simply disengages the locking lug 72 with the locking lever 76
and further retracts the plunger 90 within the net support 16. The remaining pneumatic
5 pressure can then be slowly released, permitting the lower support 56 to retract within
the housing 62 and the net support 16 to retract within the lower support 56. Resilient
bumper members 105 can be disposed onto the lower end portions 20 and 60 of the
net support 16 and lower support 56 to help cushion the controlled retraction of the
standard 10. With the standard 10 being fully retracted beneath the playing surface 14,
10 the locking lever 76 can be disengaged, allowing the locking lug 72 to position itself
forwardly, just above the upper end portion 18 of the net support 16, thus preventing its
unintended extension of the standard 10 beyond the base assembly 68.

When the user has fully extended the standard 10 so that it is at the desired
playing height with respect to the playing surface 14, the user may then couple the
15 upper end portion of the net 12 to the hook 46 of the net tensioning system 22. This is
then performed on the opposite side of the net to the accompanying net standard. The
user disposes the crank handle 40 within the gear box 32 and rotates the crank handle
40 until the proper amount of tension has been placed on the upper end portion of the
20 net 12. It is contemplated that the line extending through the lower end portion of the
net 12 could simply be tied to the net support 16 to secure the same in place.
However, it is preferred that a supplementary net tensioning system 106, similar to that
depicted in Figure 5, be provided. The supplementary net tensioning system 106 is
preferably provided with a line winch 108 and a pair of shaped engagement members

110. Keyholes 112 or similar shape of securement opening are preferably formed in the net support 16 to receive the shaped engagement members 110 therein. Once the line is secured, the line winch 108 can be actuated until the lower net line is properly tensioned and secured. The hook 46 and net tensioning system 106 provide a fast and easy means for coupling the net 12 to the standard 10. They further provide a convenient means for keeping a majority of the net mounting components with the net during storage.

It is contemplated that where high degrees of tension are put on the upper and/or lower end portions of the net, the standard 10 may bend slightly in the direction of the net. In order to compensate for this, it is contemplated that the standard 10 could be formed from a reinforced material that would naturally resist the tensioning forces. However, a more economical approach will simply be to use floor ring spacers to pitch the housing 62 and the standard 10 at an angle of only a few degrees so that when the two standards are disposed above the playing surface 14, they are slightly angled away from one another. Then, as the tension is applied to the net 12, the standards will be brought to their generally perpendicularly oriented position with respect to the playing surface.

In the drawings and in the specification, there have been set forth preferred embodiments of the invention; and although specific items are employed, these are used in a generic and descriptive sense only and not for purposes of limitation. Changes in the form and proportion of parts, as well as substitution of equivalents, are

1 contemplated as circumstances may suggest or render expedient without departing
from the spirit or scope of the invention as further defined in the following claims.

Thus it can be seen that the invention accomplishes at least all of its stated
objectives.

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